ACTIVE SMAQMD BACT CLEARINGHOUSE

CATEGORY: **OVEN/KILN**

BACT Size: Small Emitter BACT (PTE < 10 lb/day) **WOOD-FIRED CERAMIC KILN**

BACT Determination Number: 174	**BACT Determination Date:** 1/10/2018

Equipment Information

Permit Number: 24244
Equipment Description: WOOD-FIRED CERAMIC KILN
Unit Size/Rating/Capacity: <2 mmBTU/hr
Equipment Location: CALIF STATE UNIV SACTO
6000 J ST (SAC STATE CAMPUS)
SACRAMENTO, CA

BACT Determination Information

ROCs	**Standard:**	Good combustion practices
	Technology Description:	
	Basis:	Achieved in Practice
NOx	**Standard:**	Good combustion practices
	Technology Description:	
	Basis:	Achieved in Practice
SOx	**Standard:**	Good combustion practices
	Technology Description:	
	Basis:	Achieved in Practice
PM10	**Standard:**	(see below)
	Technology Description:	1. Comply with Ringelmann No. 1 or 20% opacity requirement, and 2. Restriction on starting a firing event on a Stage 1 or Stage 2 Mandatory Curtailment day as per SMAQMD Rule 421, Section 301.
	Basis:	Achieved in Practice
PM2.5	**Standard:**	(same as above for PM10)
	Technology Description:	
	Basis:	Achieved in Practice
CO	**Standard:**	Good combustion practices
	Technology Description:	
	Basis:	Achieved in Practice
LEAD	**Standard:**	N/A
	Technology Description:	N/A
	Basis:	

Comments:

District Contact: Michelle Joe Phone No.: (916) 874 - 4853 email: mjoe@airquality.org

777 12th Street, Third Floor

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Sacramento, CA 95814

BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION

DETERMINATION NO.: 174

DATE: October 16, 2017

ENGINEER: Michelle Joe

Category/General Equip Description: Wood-Fired Ceramic Kiln

Equipment Specific Description: Direct Fired, Wood-Fired Kiln for Drying Ceramics

Equipment Size/Rating: 2 mmBTU/hr

Previous BACT Det. No.: N/A

This BACT determination was determined under the project A/C 24244 (California State University, Sacramento) for a wood-fired ceramic kiln where the products of combustion come into direct contact with the ceramic ware to be dried. The 2 mmBTU/hr size rating was calculated from the proposed maximum ton/hour wood fuel rate: 4.7 tons wood/day x 2000 lb/ton x 5200 BTU/lb wood) / (24 hours/day x 1E6) = 2 mmBTU/hr. The kiln is designed such that wood is stoked in the top chamber of the bourry box, ash and embers are collected in the bottom chamber below, air is drawn down through the burning wood into the ware chamber, then the exhaust is controlled by flue dampers and vented out through a large chimney. This source category includes the criteria emissions from the combustion and pyrolysis of wood (combustion emissions), but does not address the ceramic drying emissions (i.e., hydrogen fluoride or fluoride compounds) that may form from the ceramic heat treating process since these compounds are specific to the type of ceramic ware dried.

BACT ANALYSIS

A. ACHIEVED IN PRACTICE (Rule 202, §205.1a):

The BACT/T-BACT clearinghouses for the following agencies and air pollution control districts were reviewed for control technologies currently employed for direct fired, wood-fired kilns for drying ceramics (note: although wood pyrolysis and ceramic heat treating emissions were evaluated as part of this BACT determination, no Achieved in Practice BACT standards were found):

District/Agency	Best Available Control Technology (BACT) Requirements
US EPA	**BACT** Source: EPA RACT/BACT/LAER Clearinghouse There are no BACT standards published in the clearinghouse for this category (see Attachment A for a summary of the determinations reviewed). **T-BACT:** There are no T-BACT standards published in the clearinghouse for this category. **RULE REQUIREMENTS:** 40 CFR Part 60 – New Source Performance Standards (NSPS): There are currently no 40 CFR, Part 60 NSPS sections that apply to this source category. 40 CFR Part 61 – National Emission Standards for Hazardous Air Pollutants (NESHAPS): There are currently no 40 CFR, Part 61 NESHAPs that apply to this source category. 40 CFR Part 63 – NESHAPS for Source Categories (MACT Standards): There are currently no 40 CFR, Part 63 NESHAPs that apply to this source category. The following rule was reviewed and is discussed below to verify inapplicability: 40 CFR 63 Subpart RRRRRR – National Emission Standards for Hazardous Air Pollutants for Clay Ceramics Manufacturing Area Sources (December 26, 2007) This subpart applies to clay ceramics manufacturing facilities with an atomized glaze spray booth or kiln that fires glazed ceramic ware, processing more than 45 Mg/year (50 TPY) of wet clay and is an area source of HAP emissions. As per §63.11444, a Clay Ceramics Manufacturing Facility is defined as: *"a plant site that manufactures pressed tile, sanitaryware, dinnerware, or pottery. For the purposes of this area source rule, the following types of facilities are not part of the regulated category: artisan potters, art studios, school and university ceramic arts programs, and any facility that uses less than 45 Mg/year (50 TPY) of wet clay."* This wood-fired ceramic kiln is used at a university ceramic arts program and is not a regulated category subject to this subpart.
Air Resources Board (ARB)	**BACT** Source: ARB BACT Clearinghouse (category searched: *"Boiler: Wood Fired"*) There are no BACT standards published in the clearinghouse for this category. **T-BACT:** There are no T-BACT standards published in the clearinghouse for this category. **RULE REQUIREMENTS:** ARB Airborne Toxic Control Measures (ATCM): There are currently no ATCMs that apply to this source category.

<table>
<tr><th>District/Agency</th><th>Best Available Control Technology (BACT) Requirements</th></tr>
<tr><td>SMAQMD</td><td>

BACT
Source: SMAQMD BACT Clearinghouse (category searched: *"Wood-Fired Kiln"*)
There are no BACT standards published in the clearinghouse for this category.

T-BACT:
There are no T-BACT standards published in the clearinghouse for this category.

RULE REQUIREMENTS:
There are currently no category-specific prohibitory series 400 rules that apply to direct fired, wood-fired kilns for drying ceramics.

The following rule was reviewed and is discussed below to verify inapplicability:

Rule 421 – Mandatory Episodic Curtailment of Wood and Other Solid Fuel Burning (amended 9/24/2009)
This rule applies to any person who operates a wood burning device, which is defined as "*any fireplace, wood burning heater, pellet-fueled wood burning heater, or any similar indoor or outdoor device burning any solid fuel used for aesthetic or space-heating purposes*." The rule requires that no person may have a fire or operate a wood burning device when a Mandatory Curtailment is in effect during the burning season (November through February). Although this wood-fired ceramic kiln is an outdoor device burning a solid fuel, it is not used for aesthetic or space-heating purposes and therefore is not subject to this rule.

</td></tr>
<tr><td>South Coast AQMD</td><td>

BACT
Source: SCAQMD BACT Guidelines for Non-Major Polluting Facilities, page 42

<table>
<tr><th colspan="2">For Dryer – Kiln</th></tr>
<tr><td>VOC</td><td>No standard</td></tr>
<tr><td>NOx</td><td>Natural Gas with Low NOx Burner (10-20-2000)</td></tr>
<tr><td>SOx</td><td>No standard</td></tr>
<tr><td>PM10</td><td>Natural gas (1988)</td></tr>
<tr><td>PM2.5</td><td>No standard</td></tr>
<tr><td>CO</td><td>No standard</td></tr>
</table>

Source: SCAQMD LAER/BACT Determinations (keyword searched: "Kiln")
There are no BACT standards published in the clearinghouse for this category.

T-BACT:
There are no T-BACT standards published in the clearinghouse for this category.

</td></tr>
</table>

District/Agency	Best Available Control Technology (BACT) Requirements
South Coast AQMD (continued)	**RULE REQUIREMENTS:** There are currently no category-specific prohibitory rules that apply to direct fired, wood-fired kilns for drying ceramics. The following rule was reviewed and is discussed below to verify inapplicability: Regulation IV, Rule 445 – Wood Burning Devices (amended 5/3/2013) This rule applies to wood burning devices that burn solid fuel used for aesthetic purposes and which have a heat input of <1 mmBTU/hr. This wood-fired ceramic kiln is not used for aesthetic or space-heating purposes and therefore is not subject to this rule. Regulation XI, Rule 1146.2 – Emissions of Oxides of Nitrogen from Large Water Heaters and Small Boilers and Process Heaters (amended 5/5/2006) This rule applies to natural gas-fired water heaters, boilers, and process heaters with a rated heat input capacity of ≤2 mmBTU/hr. Kilns used for drying are specifically excluded from the definition of "process heater" and therefore are exempt from this rule. Regulation XI, Rule 1147 - NOx Reductions from Miscellaneous Sources (amended 7/7/2017) This rule applies to ovens, dryers, dehydrators, heaters, kilns, calciners, furnaces, crematories, incinerators, heated pots, cookers, roasters, fryers, closed and open heated tanks and evaporators, distillation units, afterburners, degassing units, vapor incinerators, catalytic or thermal oxidizers, soil and water remediation units and other combustion equipment with nitrogen oxide emissions that require a District permit **and are not** specifically required to comply with a nitrogen oxide emission limit by other District Regulation XI rules. This rule specifically applies to combustion equipment fired on liquid or gaseous fuel, and therefore does not apply to solid fuel fired (wood-fired) kilns.

District/Agency	Best Available Control Technology (BACT) Requirements
San Joaquin Valley APCD	**BACT** Source: SJVUAPCD BACT Searchable Clearinghouse (keywords searched: *"Kiln," "Ceramic," or "Wood-Fired"*) There are no BACT standards published in the clearinghouse for this category. **T-BACT:** There are no T-BACT standards published in the clearinghouse for this category. **RULE REQUIREMENTS:** There are currently no category-specific prohibitory rules that apply to direct fired, wood-fired kilns for drying ceramics. The following rules were reviewed and are discussed below to verify inapplicability: Rule 4307 – Boilers, Steam Generators, and Process Heaters – 2.0 MMBtu/hr to 5.0 MMBtu/hr (amended 4/21/2016) This rule applies to boilers, steam generators, and process heaters fired on liquid or gaseous fuel. Kilns used for drying are specifically excluded from the definition of "process heater" and therefore are exempt from this rule. Rule 4309 – Dryers, Dehydrators, and Ovens (adopted 12/15/2005) This rule applies to dryers, dehydrators, or ovens fired on gaseous and/or liquid fuel, and therefore does not apply to solid fuel fired (wood-fired) kilns. Rule 4352 – Solid Fuel Fired Boilers, Steam Generators, and Process Heaters (amended 12/15/2011) This rule applies to solid fuel fired boilers, steam generators and process heaters. Kilns used for drying are specifically excluded from the definition of "process heater" and therefore are exempt from this rule. Rule 4901 – Wood Burning Fireplaces and Wood Burning Heaters (amended 9/18/2014) This rule applies to wood burning fireplaces, wood burning heaters, and outdoor wood burning devices (defined as any wood burning fireplace, or other device designed to burn wood, and that is located outside of a building or structure; includes, but is not limited to: burn bowls, fire rings/pits, and chimineas; does not include: fire pits at state parks, national parks, or national forests). Although this rule does not specifically exempt wood-fired kilns used for ceramic drying, the intent of this rule (as described in SJVAPCD's FAQs and as intended in other similar rules in SMAQMD, SCAQMD, BAAQMD, and YSAQMD) is to limit emissions of particulate matter and visible emissions from wood burning devices used for space-heating or aesthetic purposes by prohibiting operation during any mandatory curtailment periods. Althought this ceramic kiln burns wood and is located outside of a building or structure, it is not used for aesthetic or space-heating purposes and therefore is not intended to be subject to this rule.

District/Agency	Best Available Control Technology (BACT) Requirements
Bay Area AQMD	**BACT** Source: BAAQMD BACT/TBACT Workbook (keywords searched: *"Kiln," "Ceramic," or "Wood-Fired")* There are no BACT standards published in the clearinghouse for this category. **T-BACT:** There are no T-BACT standards published in the clearinghouse for this category. **RULE REQUIREMENTS:** There are currently no category-specific prohibitory rules that apply to direct fired, wood-fired kilns for drying ceramics. The following rules were reviewed and are discussed below to verify inapplicability: Regulation 6, Rule 3 – Wood Burning Devices (amended 10/21/2015) This rule limits emissions of particulate matter and visible emissions from wood burning devices for space-heating or aesthetic purposes by prohibiting operation during any mandatory curtailment periods. This wood-fired ceramic kiln is not used for space-heating or aesthetic purposes and therefore is not subject to this rule. Regulation 9, Rule 7 – Nitrogen Oxides and Carbon Monoxide from Industrial, Institutional, and Commercial Boilers, Steam Generators, And Process Heaters (amended 5/4/2011) This rule applies to industrial, institutional and commercial boilers, steam generators and process heaters. As per Section 9-7-110.6, kilns, ovens, and furnaces used for drying, baking, heat treating, cooking, calcining, or vitrifying are exempt from this rule.
San Diego County APCD	**BACT** Source: NSR Requirements for BACT Guidelines (June 2011) (keywords searched: *"Kiln," "Ceramic," or "Wood-Fired"*) There are no BACT standards published in the clearinghouse for this category. **T-BACT:** There are no T-BACT standards published in the clearinghouse for this category. **RULE REQUIREMENTS:** There are currently no category-specific prohibitory rules that apply to direct fired, wood-fired kilns for drying ceramics. The following rule was reviewed and is discussed below to verify inapplicability: Rule 69.2.1 – Small Boilers, Process Heaters, and Steam Generators (effective 3/25/2010) This rule applies to gaseous and/or liquid fuel fired boilers, process heaters, and steam generators with a heat input rating from 0.6 mmBTU/hr to 2 mmBTU/hr. As per Section (b)(ii), furnaces, kilns, and any combustion equipment where the material being heated is in direct contact with the products of combustion are exempt from this rule.

District/Agency	Best Available Control Technology (BACT) Requirements
Ventura County APCD	**BACT** Source: ARB BACT Clearinghouse (category searched: *"Boiler: Wood Fired"*) There are no BACT standards published in the clearinghouse for this category. **T-BACT:** There are no T-BACT standards published in the clearinghouse for this category. **RULE REQUIREMENTS:** There are currently no category-specific prohibitory rules that apply to direct fired, wood-fired kilns for drying ceramics. The following rule was reviewed and is discussed below to verify inapplicability: Rule 74.15.1 – Boilers, Steam Generators and Process Heaters (1 to 5 MMBTUs) (revised 6/23/15) This rule applies to any gaseous fuel or liquid fuel fired boiler, steam generator, or process heater with a rated heat input capacity ≥1 mmBTU/hr and <5 mmBTU/hr, and therefore does not apply to solid fuel fired (wood-fired) kilns.
Yolo Solano AQMD	**BACT** Source: ARB BACT Clearinghouse (category searched: *"Boiler: Wood Fired"*) There are no BACT standards published in the clearinghouse for this category. **T-BACT:** There are no T-BACT standards published in the clearinghouse for this category. **RULE REQUIREMENTS:** There are currently no category-specific prohibitory rules that apply to direct fired, wood-fired kilns for drying ceramics. The following rules were reviewed and are discussed below to verify inapplicability: Rule 2.27 – Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters (revised 8/14/1996) This rule applies to boilers, steam generators, and process heaters with rated heat inputs of greater than or equal to 5 mmBTU/hr, used in all industrial, institutional, and commercial operations. This kiln is is excluded from the definition of "process heater" since the material being dried comes in direct contact with the products of combustion, and therefore is not subject to this rule. Rule 2.40 – Wood Burning Applicances (adopted 12/8/2004) This rule applies to any fireplace, wood burning heater, or pellet-fired wood heater, or any similar enclosed device burning any solid fuel used for aesthetic or space-heating purposes, which has a heat input of less than 1 mmBTU/hr. This wood-fired ceramic kiln is not used for aesthetic or space-heating purposes and therefore is not subject to this rule.

Summary of Achieved in Practice Control Technologies

The following control technologies have been identified and are ranked based on stringency:

SUMMARY OF ACHIEVED IN PRACTICE CONTROL TECHNOLOGIES	
VOC	1. No standard [EPA, ARB, SMAQMD, SCAQMD, SJVAPCD, BAAQMD, SDCAPCD, VCAPCD, YSAQMD]
NOx	1. Natural Gas with Low NOx Burner [SCAQMD] 2. No standard [EPA, ARB, SMAQMD, SJVAPCD, BAAQMD, SDCAPCD, VCAPCD, YSAQMD]
SOx	1. No standard [EPA, ARB, SMAQMD, SCAQMD, SJVAPCD, BAAQMD, SDCAPCD, VCAPCD, YSAQMD]
PM10	1. Natural Gas [SCAQMD] 2. No standard [EPA, ARB, SMAQMD, SJVAPCD, BAAQMD, SDCAPCD, VCAPCD, YSAQMD]
PM2.5	1. No standard [EPA, ARB, SMAQMD, SCAQMD, SJVAPCD, BAAQMD, SDCAPCD, VCAPCD, YSAQMD]
CO	1. No standard [EPA, ARB, SMAQMD, SCAQMD, SJVAPCD, BAAQMD, SDCAPCD, VCAPCD, YSAQMD]

Discussion on Achieved in Practice Control Technologies:

Natural Gas Fuel with Low NOx Burner – Although the facility already uses several <1 mmBTU/hr natural gas-fired kilns as part of its university ceramic arts program, the wood-fired ceramic kiln provides a natural ash glaze that is unique to this process. Furthermore, this kiln was designed by artist Masakazu Kusakabe to achieve the same firing effects of a larger kiln over a shorter period of time; whereas a larger wood-fired kiln would typically require a 10-day firing event, Kusakabe's design compressed the ceramic ware chamber to concentrate the ash and firing effects to a smaller area over a 3-day firing event. Therefore, natural gas and a low NOx burner are not technologically feasible options since the natural ash glaze is inherent to the wood fuel and Kusakabe's kiln design.

Due to the lack of other achieved in practice options and the limited operational nature of the wood-fired ceramic kiln for this project (3 kiln firings per year, with 3 days of operation per kiln firing), the achieved in practice BACT will be considered no additional controls beyond good combustion practices, limiting visible emissions to comply with the Ringelmann No. 1 or 20% opacity requirement of SMAQMD Rule 401 (Ringelmann Chart), and restricting starting a firing event on a Stage 1 or Stage 2 Mandatory Curtailment day to comply with SMAQMD Rule 421 (Mandatory Episodic Curtailment of Wood and Other Solid Fuel Burning).

SMAQMD Rule 421 requires that no person may have a fire or operate a wood burning device when a Mandatory Curtailment is in effect during the burning season (November through February). According to this facility's application, the kiln normally fires once during the fall semester (August through December) and once during the spring semester (January through May), with a potential of a third firing for special events. Therefore, the normal operation of this kiln may operate during the burning season. Although the kiln is not explicitly subject to this rule, permit conditions restricting starting a firing event on a Stage 1 or Stage 2 Mandatory Curtailment day will be incorporated as part of this BACT determination.

The following control technologies have been identified as the most stringent, achieved in practice control technologies:

BEST CONTROL TECHNOLOGIES ACHIEVED		
Pollutant	**Standard**	**Source**
VOC	No standard	EPA, ARB, SMAQMD, SCAQMD, SJVAPCD, BAAQMD, SDCAPCD, VCAPCD, YSAQMD
NOx	No standard	EPA, ARB, SMAQMD, SJVAPCD, BAAQMD, SDCAPCD, VCAPCD, YSAQMD
SOx	No standard	EPA, ARB, SMAQMD, SCAQMD, SJVAPCD, BAAQMD, SDCAPCD, VCAPCD, YSAQMD
PM10	No standard	EPA, ARB, SMAQMD, SJVAPCD, BAAQMD, SDCAPCD, VCAPCD, YSAQMD
PM2.5	No standard	EPA, ARB, SMAQMD, SCAQMD, SJVAPCD, BAAQMD, SDCAPCD, VCAPCD, YSAQMD
CO	No standard	EPA, ARB, SMAQMD, SCAQMD, SJVAPCD, BAAQMD, SDCAPCD, VCAPCD, YSAQMD

B. TECHNOLOGICALLY FEASIBLE AND COST EFFECTIVE (Rule 202, §205.1.a.):

Technologically Feasible Alternatives:
Any alternative basic equipment, fuel, process, emission control device or technique, singly or in combination, determined to be technologically feasible by the Air Pollution Control Officer.

Due to the limited information available for wood-fired ceramic kilns, the possible control technologies for small (<10 mmBTU/hr) wood-fired boilers were reviewed as a comparable source. The following technologically feasible alternatives from Resource Systems Group, Inc.'s *An Evaluation of Air Pollution Control Technologies for Small Wood-Fired Boilers* (July 2001) and BAAQMD's BACT Guideline No. 17.9.1 (8/5/1991) were reviewed:

Pollutant	Technologically Feasible Alternatives	Technological Feasibility Review
VOC	1. No other technologically feasible option identified	Most VOCs are listed as TACs and controlled as T-BACT [Resource Systems Group]
	2. Good combustion practices	Achieved in practice for wood-fired boilers [BAAQMD BACT No. 17.9.1]
NOx	1. Selective Catalytic Reduction (SCR)	Not practical due to costs and ammonia slip control [Resource Systems Group]
	2. Selective Non-Catalytic Reduction (SNCR)	Not practical due to inferior control compared to SCR systems and ammonia slip control [Resource Systems Group]
	3. Oxidation Catalysts	Not practical due to exhaust temperatures being too low [Resource Systems Group]
SOx	1. No other technologically feasible option identified	SOx emissions usually very low [Resource Systems Group]

Pollutant	Technologically Feasible Alternatives	Technological Feasibility Review
	2. Dry scrubber with baghouse	Technologically feasible/cost effective for wood-fired boilers [BAAQMD BACT No. 17.9.1]; however, baghouse not recommended due to fire risk [Resource Systems Group]
	3. Limestone injection with baghouse	Achieved in practice for wood-fired boilers according to CARB/CAPCOA Clearinghouse [BAAQMD BACT No. 17.9.1]; however, baghouse not recommended due to fire risk [Resource Systems Group]
PM10 and PM2.5	1. Fabric filters or baghouses	Possible fire risk [Resource Systems Group]
	2. Electrostatic precipitators	Not economically feasible for small boilers [Resource Systems Group]
	3. Core separators	Not in commercial production [Resource Systems Group]
	4. Venturi and wet scrubbers	Not widely installed on small boilers [Resource Systems Group]
	5. Multicyclones	Less efficient for PM<10 [Resource Systems Group]
	6. Cyclones	Less efficient than multicyclones or core separators [Resource Systems Group]
CO	1. No other technologically feasible option identified	Not practical for small boilers [Resource Systems Group]

Based on the above table, the only technologically feasible option for VOC is good combustion practices.

Cost Effectiveness Determination:

Since no technologically feasible alternatives were identified, a cost effectiveness analysis is not required.

D. SELECTION OF T-BACT:

There are no Federal NSPS's, NESHAP's nor State ATCM's applicable for this source category. None of the sources surveyed have any toxic T-BACT determinations published. Therefore, T-BACT standards will be considered as meeting the BACT standards identified above.

REVIEWED BY: Brian F Lee **DATE:** 1-10-18

APPROVED BY: [signature] **DATE:** 1-16-18

Attachment A

Review of BACT Determinations Published by EPA

List of applicable[A] BACT determinations published in EPA's RBLC Clearinghouse for **Process Code 19.600 (Misc. Boilers, Furnaces, Heaters), Process Code 19.900 (Other Misc. Combustion), and keywords "kiln," "ceramic," or "wood-fired"**:

Process Code 19.600 – Misc. Boilers, Furnaces, Heaters								
Description and Capacity	**RBLC ID**	**Date**	**Case-By-Case Basis**	**VOC**	**NOx**	**SOx**	**PM10/2.5**	**CO**
Wood-Fired Furnace for Drying Strandboard, 250 mmBTU/hr	TX-0770	10/23/2015	BACT-PSD	N/A	N/A	N/A	N/A	285.0200 tons/year, good operating practices and regenerative thermal oxidizer
Waste Wood-Fired Kiln for Lumber Drying, 90 million board feet/year	FL-0340	4/1/2014	BACT-PSD	3.5000 lb/thousand board feet, best management practices	N/A	N/A	N/A	N/A
Biomass-Fired Boiler, 352.8 mmBTU/hr	OR-0051	2/11/2014	LAER	N/A	N/A	N/A	0.0100 lb/mmBTU, multiclones, electrostatic precipitator, urea-injection SNCR, flue gas recirculation, low-NOx combustion	N/A
Wood-Fired Kiln for Lumber Drying, 60 million board feet/year	LA-0281	1/31/2014	BACT-PSD	29.2700 lb/hr, proper kiln design and operation, annual	N/A	N/A	N/A	N/A

Process Code 19.600 – Misc. Boilers, Furnaces, Heaters								
Description and Capacity	**RBLC ID**	**Date**	**Case-By-Case Basis**	**VOC**	**NOx**	**SOx**	**PM10/2.5**	**CO**
				production limit				
Wood/Bark-Fired Boiler, 256.44 mmBTU/hr	LA-0294	12/30/2013	BACT-PSD	3.45 lb/hr, good combustion practices	N/A	N/A	N/A	N/A
Wood Residue-Fired Boiler, 60 mmBTU/hr	AR-0123	10/18/2013	BACT-PSD	4.2 lb/hr	N/A	N/A	N/A	N/A
Wood Residual-Fired Boiler, 125 mmBTU/hr	AL-0260	1/4/2011	BACT-PSD	0.5000 lb/mmBTU	N/A	N/A	N/A	N/A
Wood-Fired Boiler, 96 MW	GA-0140	12/3/2010	BACT-PSD	0.0500 lb/mmBTU, good combustion practices	N/A	N/A	0.0400 lb/mmBTU, high-frequency power supply, multiclone mechanical collector system	0.4500 lb/mmBTU, good combustion practices
Wood and Natural Gas-Fired Boiler, 190 mmBTU/hr	CA-1208	10/21/2010	BACT-PSD	26.0000 lb/hr	N/A	15.0000 ppm @ 12% CO_2	0.0500 gr/dscf @ 12% CO_2, multiclone collector, electrostatic precipitator	1200.0000 ppmvd @ 12% CO_2, good combustion practices
Wood Waste and Residue-Fired Boiler, 693 mmBTU/hr	TX-0555	10/26/2009	BACT-PSD	0.0100 lb/mmBTU	0.0750 lb/mmBTU, SCR	0.0250 lb/mmBTU	0.0120 lb/mmBTU (filterable), 0.0250 lb/mmBTU	0.0750 lb/mmBTU, good combustion practices

Process Code 19.600 – Misc. Boilers, Furnaces, Heaters								
Description and Capacity	**RBLC ID**	**Date**	**Case-By-Case Basis**	**VOC**	**NOx**	**SOx**	**PM10/2.5**	**CO**
							(total), electrostatic precipitator	
Wood-Fired Boiler, 72 mmBTU/hr, 525,000 tons/year	AL-0255	5/18/2009	BACT-PSD	N/A	0.2200 lb/mmBTU, staged combustion	N/A	N/A	N/A
Wood-Fired Boiler, 69.30 mmBTU/hr	TN-0159	1/28/2009	BACT-PSD	N/A	0.2500 lb/mmBTU, good combustion practices	N/A	N/A	N/A
Wood Residue-Fueled, Direct-Fired Kiln for Drying Lumber, 25 mmBTU/hr, 12,100 board feet/hr	AR-0101	8/25/2008	BACT-PSD	N/A	N/A	N/A	N/A	N/A

(A) "Applicable" criteria included: kiln, rated $\leq$ 2 mmBTU/hr, direct-fired, wood-fired, application for drying ceramics.

= Excluded from the scope of this determination according to the following criteria: indirect-fired, diesel fueled, natural gas fueled, biomass fueled, petroleum coke fueled, coal fueled, furnace, boiler, lime kiln, wood lumber kiln, cement kiln, preheater/precalciner kiln, case-by-case basis other than BACT.